Nanotechnology standardization – A survey

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1 Introduction

The European and International Standardization Institutes CEN and ISO agreed that Standardization on nanotechnology is indispensable. ISO/TC 229 “Nanotechnologies” and CEN/TC 352 “Nanotechnologies” were established.

2 Involved parties

Involved key players: Universities, industry – esp. the chemical industry – and public authorities.

Further involved parties: OECD Working Party on Manufactured Nanomaterials, ANF (Asia Nano Forum), VAMAS (Versailles Project on Advanced Materials and Standards) and JRC (Joint Research Center of the European Commission).

Standardization committees cooperating: ISO/TC 24/SC 4 (Sizing by methods other than sieving), ISO/TC 35 (Paints and varnishes), ISO/TC 201 (Surface chemical analysis), etc …

3 ISO/TC 229

3.1 Structure

- ISO/TC 229 Nanotechnologies
- Working group JWG 1 Terminology and nomenclature
- Working group JWG 2 Measurement and characterization
- Working group WG 3 Health, Safety and Environmental Aspects of Nanotechnologies
- Working group WG 4 Material specifications
- Task group on Nanotechnologies and sustainability
- Task group on Societal and Consumer Dimensions of Nanotechnologies

3.2 Projects

3.2.1 Working Group JWG 1 Terminology and nomenclature

Published standards
Technical Specification ISO/TS 27687, *Nanotechnologies – Terminology and definitions for nano-objects – Nanoparticle, nanofibre and nanoplate.* This is a basic document which introduces the new term “nano-objects” as umbrella term for the terms nanoparticles, nanofibres and nanplates which are also defined in the Technical Specification. The document specifies the nanoscale as a size-range from 1 nm to 100 nm and the umbrella term nano-object is specified as a material with one, two or three external dimensions in the nano-scale. According to this logic a nanoparticle is defined as a nano-object with three external dimensions in the nanoscale.

Standards under development
- Core terms
- Nanostructured materials
- Bio-nano interface
- Medical health and personal care applications …

3.2.2 Working group JWG 2 Measurement and characterization

No published standards

Standards under development
9 projects are dealing with the characterization methods for carbon nano tubes: TEM, SEM and EDX, UV-Vis-NIR spectroscopy, near infrared photoluminescence spectroscopy, TGA, Raman spectroscopy and ICP-MS.
An important role plays General Framework for Determining Nanoparticle Content in Nanomaterials by Generation of Aerosols and will specify a standardized way how to generate an aerosol out of a powder for which the nanoparticle content shall be measured (Project leader from Germany).

3.2.3 Working group WG 3 Health, Safety and Environmental Aspects of Nanotechnologies

Published standards
Technical Report ISO/TR 12885, Nanotechnologies – Health and safety practices in occupational settings relevant to nanotechnologies

Standards under development
- ISO 10801 Generation of Metal Nanoparticles with the Evaporation/Condensation Method for Inhalation Toxicity Testing
- ISO 10808 Characterization of Nanoparticles in Inhalation Exposure Chambers for Inhalation Toxicity Testing
- ISO/TS 14101 Surface characterization of gold nanoparticles for nanomaterial specific toxicity screening: FT-IR method
- ISO/TR 13014 Guidance on physicochemical characterization of engineered nanoscale materials for toxicologic assessment)
- ISO/TS 12901-1 Safe handling and disposal
- ISO/TS 12901-2 Occupational risk management
- ISO/TR 13121 Risk evaluation framework
- ISO/TR 13329 Guideline for material safety data sheets

3.2.4 Working Group WG 4 Material specifications

No published standards

Standards under development
- ISO/TS 12805 General guidance on specifying nanomaterials
- ISO/TS 11937 Specifications for titanium dioxide
- ISO/TS 11931 Specifications for calcium carbonate

4 CEN/TC 352

Works in close cooperation with ISO/TC 229. But CEN/TC 352 also works on projects which are not covered by ISO/TC 229 or works on common projects in a leading role. CEN/TC 352 actively works on 3 projects of which the most important one would be a guide to labelling of manufactured nanoparticles and products containing manufactured nanoparticles (CEN/TS 13830). The result of this work is intended to be adopted by ISO. The other projects are CEN/TR 11811, *Guide to methods for nanotribology measurements,* and CEN/TR 11808, *Guide to nanoparticle measurement methods and their limitations.*

EC-Mandate
The European Commission allocates to CEN/TC 352 a mandate to develop standards which the European Commission can use in terms of regulation. The usual voluntariness to use a standard will no longer apply for the mandated harmonized European Standards developed by CEN/TC 352.